

Claims

1. A nitrogen oxide decomposing element, characterized by comprising:

a conductive solid electrolyte film for selectively allowing a hydrogen ion to pass through;

a first electrode made of an electronic conductivity base material disposed on a part of a surface of the conductive solid electrolyte film and a catalyst for accelerating anodic oxidation;

a second electrode made of an electronic conductivity base material disposed on the other part of the surface of the conductive solid electrolyte film and a catalyst for accelerating cathodic reduction; and

a platinum group catalyst supported by a porous metal oxide disposed to be adjacent to the second electrode.

2. The nitrogen oxide decomposing element according to claim 1, wherein the first and the second electrodes are respectively provided on opposed plane surfaces of the surface of the conductive solid electrolyte film.

3. The nitrogen oxide decomposing element according to claim 1, wherein the first and the second electrodes are provided on a same plane surface of the surface of the conductive solid electrolyte film.

4. The nitrogen oxide decomposing element according to claim

1, wherein a mixed layer including an electronic conductivity base material, a solid electrolyte film, a platinum group catalyst and a cathodic catalyst is provided between the conductive solid electrolyte film and the second electrode.

5. The nitrogen oxide decomposing element according to claim 1, wherein the metal oxide is an acidic oxide or an amphoteric oxide.

6. The nitrogen oxide decomposing element according to claim 5, wherein the metal oxide includes at least one component of titanium dioxide, zirconium dioxide, aluminum oxide, silicon oxide, magnesium oxide, and tin oxide.

7. The nitrogen oxide decomposing element according to claim 1, wherein the platinum group catalyst includes at least one component of platinum, iridium, and palladium.

8. A nitrogen oxide decomposing apparatus, characterized by comprising:

the nitrogen oxide decomposing element according to any one of claims 1 to 7 and a frame holding this;

a gas supply ports for supplying an anode gas and a cathode gas into the frame;

a gas exhaust port for exhausting the gases in the frame to outside; and

a power source for applying a DC voltage between the first and the second electrodes.

9. The nitrogen oxide decomposing apparatus according to

claim 8, wherein a gas containing water vapor is supplied as the anode gas.

10. The nitrogen oxide decomposing apparatus according to claim 8, wherein a gas containing nitrogen oxide is supplied as the cathode gas.

11. The nitrogen oxide decomposing apparatus according to claim 8, wherein the nitrogen oxide decomposing apparatus further comprises a sensor for detecting a concentration of nitrogen oxide, and a control device for controlling a magnitude of a current flowing between the first and the second electrodes and an energization time in accordance with the concentration of the nitrogen oxide detected by the sensor.

12. The nitrogen oxide decomposing apparatus according to claim 11, wherein the sensor is located in a vicinity of the platinum group catalyst supported by the metal oxide.